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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,346	09/11/2003	Isao Hasegawa	57810-074	7087

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EXAMINER

SCHILLINGER, LAURA M

ART UNIT PAPER NUMBER

2813

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/659,346

Applicant(s)

HASEGAWA ET AL.

Examiner

Laura M. Schillinger

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 September 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
4a) Of the above claim(s) 5-11 and 13-17 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-4, 12 and 18-21 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 12, 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugahara et al ('381).

Sugahara anticipates the following claim limitations as cited below:

1. A method of comprising steps of fabricating a semiconductor device forming a silicon layer to be in contact with at least either the upper surface or the lower surface of a first film (16) having a contact angle of not more than about 45 degrees with respect to molten silicon (14); and crystallizing said silicon layer after melting said silicon layer by heating said silicon layer with a continuously oscillated electromagnetic wave (Fig.7 and Col.8, lines: 20-25).
2. The method of fabricating a semiconductor device according to claim 1, wherein said first film (16) has a smaller contact angle with respect to molten silicon (14) than a silicon oxide film (21) (Compare Fig.7 contact angle between 14 and 16; with 14 and 21).

3. The method of fabricating a semiconductor device according to claim 2, wherein said first film includes at least either an SiNx film (16) having a contact angle of not more than about 45 degrees with respect to molten silicon (14) (Fig.7).

4. The method of fabricating a semiconductor device according to claim 2. wherein said first film includes an SiC film (Fig.7 (16)).

12. The method of fabricating a semiconductor device according to claim 1, wherein said step of crystallizing said silicon layer includes a step of heating said silicon layer with a fundamental wave of said continuous-wave laser beam (Col.10, lines: 15-20).

18. The method of fabricating a semiconductor device according to claim 1, further comprising a step of forming roughness on the surface of said first film to be formed with said silicon layer in advance of said step of forming said silicon layer (Col.8, lines:10-15- stripes).

19. The method according to claim of fabricating a semiconductor device 18, wherein said step of forming said roughness includes a step of forming said roughness on the surface of said first film by etching the surface of said first film (Col.8, lines: 10-15).

20. The method of fabricating a semiconductor device according to claim1, wherein said first film having said contact angle of not more than about 450 with respect to molten silicon is an SiNx film formed by plasma CVD (Col.3, lines: 50-55).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugahara et al ('381).

Sugahara teaches forming the silicon nitride film by CVD however fails to teach setting the flow ratios of SiH₄ gas, NH₃ gas and N₂ gas to 2:1:100 to 2:2:100 as recited in claim 21. The selection of the flow ratios is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species. In re Jones, 162 USPQ 224 (CCPA 1955)(the selection of optimum ranges within prior art general conditions is obvious) and In re Boesch, 205 USPQ 215 (CCPA 1980)(discovery of optimum value of result effective variable in a known process is obvious).

Response to Arguments

Applicant's arguments filed 9/7/05 have been fully considered but they are not persuasive. Applicant asserts that the contact angle between molten silicon and a silicon nitride surface cannot be ascertained at being less than 45 degrees and amounts only to speculation by

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the Examiner. However such a feature is an inherent characteristic of the physical chemistry as taught by Chen et al ('610)- see Col.4, lines: 24-30.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M. Schillinger whose telephone number is (571) 272-1697. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Laura M Schillinger', followed by a large, stylized flourish or signature mark.

Laura M Schillinger
Primary Examiner
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11/11/05